

WHAT IS CLAIMED IS:

1. An optical information recording medium comprising a disk-shaped transparent substrate and a recording layer for recording, reproducing or
5 erasing information by irradiation of laser light, the recording layer being formed over the substrate, wherein
the recording layer comprises information tracks including groove tracks and land tracks that are formed alternately in a radial direction of the disk,
10 the information tracks comprise information recording regions and address regions interposed between the information recording regions, the information recording regions and the address regions being arranged along a tracking direction of the laser light,
in the information recording regions, every second step in the radial
15 direction of steps for dividing the groove tracks from the land tracks adjacent to the groove tracks is wobbled in the tracking direction, and in a range whose ends are defined by the address regions the every second step is wobbled at a constant frequency, and
prepit addresses for providing information on a position on the
20 recording medium are formed in the address regions.
2. The optical information recording medium of claim 1, wherein a pair of adjacent information tracks in the radial direction of the disk have a common address region on which a common prepit address is formed.
- 25 3. The optical information recording medium of claim 2, wherein the common prepit address is formed so as to straddle a boundary of the pair of information tracks.
- 30 4. The optical information recording medium of claim 2, wherein the pair of information tracks that share the common address region share the wobbled step in the information recording region.
- 35 5. The optical information recording medium of claim 2, wherein at least one of the pair of information tracks that share the common address region has a groove-land identifying pit in the common address region.

6. The optical information recording medium of claim 1, further comprising tracks for correcting servo conditions.
- 5 7. The optical information recording medium of claim 6, wherein the tracks for correcting servo conditions are provided in the groove tracks and the land tracks.
- 10 8. The optical information recording medium of claim 1, which has a double spiral structure in which the groove tracks and the land tracks form independent spirals from each other.
- 15 9. The optical information recording medium of claim 1, which has a single spiral structure in which the groove tracks and the land tracks form a single spiral by alternating the groove tracks and the land tracks.
- 20 10. The optical information recording medium of claim 9, wherein no pair of adjacent address regions in the radial direction of the disk are arranged so as to be aligned on a straight line passing through a center of the disk, the address region being formed in a position at which the groove track is alternated with the land track.
- 25 11. The optical information recording medium of claim 1, wherein no pair of adjacent address regions in the radial direction of the disk are arranged so as to be aligned on a straight line passing through a center of the disk.
- 30 12. The optical information recording medium of claim 11, wherein steps for dividing the groove tracks from the land tracks are formed at both boundaries between the address region and two information recording regions adjacent to the address region in the radial direction of the disk.
- 35 13. The optical information recording medium of claim 2, wherein no pair of adjacent common address regions in the radial direction of the disk are arranged so as to be aligned on a straight line passing through a center of the disk.
14. The optical information recording medium of claim 13, wherein the prepit addresses are formed so as to straddle a boundary of a pair

of information tracks in the common address regions, and

steps for dividing the groove tracks from the land tracks are formed at both boundaries between the common address region and two information recording regions adjacent to the common address region in the radial direction of the disk.

15. The optical information recording medium of claim 1, wherein the recording layer comprises a material that changes reversibly between a crystalline state and an amorphous state by irradiation of layer light.

16. The optical information recording medium of claim 1, comprising at least two recording layers.

17. The optical information recording medium of claim 16, comprising a first recording layer and a second recording layer,

the first recording layer including a first information track for guiding the laser light from an inner disk circumference side to an outer disk circumference side by rotation of the disk in a predetermined direction, and

the second recording layer including a second information track for guiding the laser light from an outer disk circumference side to an inner disk circumference side by rotation of the disk in the predetermined direction.

18. A recording/reproducing method for an optical information recording medium for recording, reproducing or erasing information by irradiating the optical information recording medium of claim 1 with laser light, comprising:

recording, reproducing or erasing the information at a constant linear velocity in all the information recording regions while controlling a rotation speed of the recording medium with a rotation control signal obtained from the wobbled steps.

19. An optical information recording medium comprising a disk-shaped transparent substrate and n recording layers (where n is an integer of at least 2) for recording, reproducing or erasing information by irradiation of laser light, the recording layers being formed over the substrate, wherein

the recording layers comprise information tracks,
the information tracks comprise information recording regions and address regions interposed between the information recording regions, the

information recording regions and the address regions being arranged along a tracking direction of the laser light,

prepit addresses for providing information on a position on the recording medium are formed on the address regions, and

5 in at least the first recording layer to the (n-1)th recording layer from the transparent substrate side, no pair of adjacent address regions in the radial direction of the disk are arranged so as to be aligned on a straight line passing through a center of the disk.

10 20. The optical information recording medium of claim 19, wherein the information tracks include groove tracks and land tracks that are formed alternately in the radial direction of the disk.

15 21. The optical information recording medium of claim 19, wherein steps for dividing the groove tracks from the land tracks are formed at both boundaries between the address region and two information recording regions adjacent to the address region in the radial direction of the disk.

20 22. The optical information recording medium of claim 19, wherein in the first recording layer to the (n-1)th recording layer from the transparent substrate side, a transmittance of the laser light is changed by recording information.

25 23. The optical information recording medium of claim 19, comprising a first recording layer and a second recording layer,

the first recording layer including a first information track for guiding the laser light from an inner disk circumference side to an outer disk circumference side by rotation of the disk in a predetermined direction, and

30 the second recording layer including a second information track for guiding the laser light from an outer disk circumference side to an inner disk circumference side by rotation of the disk in the predetermined direction.

24. A recording/reproducing method for an optical information recording medium for recording, reproducing or erasing information by irradiating an optical information recording medium with laser light,

the optical information recording medium comprising a disk-shaped transparent substrate and a recording layer for recording, reproducing or

erasing information by irradiation of laser light, the recording layer being formed over the substrate, wherein

the recording layer comprises information tracks,

the information tracks comprise information recording regions and
5 address regions interposed between the information recording regions, the information recording regions and the address regions being arranged along the tracking direction of the laser light,

prepit addresses for providing information on a position on the recording medium are formed on the address regions, and

10 no pair of adjacent address regions in the radial direction of the disk are arranged so as to be aligned on a straight line passing through a center of the disk,

the method comprising:

detecting reflected light obtained by irradiating the recording medium
15 with the laser light by a photodetector including two light-receiving portions divided in a direction corresponding to a tracking direction of the laser light;

generating a sum signal and a difference signal of electrical signals output from the two light-receiving portions;

generating a corrected sum signal obtained by correcting an amplitude
20 variation of the sum signal with the difference signal; and

generating data information from the corrected sum signal, thereby reproducing the information.

25 25. The recording/reproducing method of claim 24, wherein the optical information recording medium is the optical information recording medium of claim 19.

26. A recording/reproducing apparatus for an optical information recording medium for recording, reproducing or erasing information by irradiating an
30 optical information recording medium with laser light,

the optical information recording medium comprising a disk-shaped transparent substrate and a recording layer for recording, reproducing or erasing information by irradiation of laser light, the recording layer being formed over the substrate, wherein

35 the recording layer comprises information tracks,

the information tracks comprise information recording regions and address regions interposed between the information recording regions, the

information recording regions and the address regions being arranged along the tracking direction of the laser light,

prepit addresses for providing information on a position on the recording medium are formed on the address regions, and

5 no pair of adjacent address regions in the radial direction of the disk are arranged so as to be aligned on a straight line passing through a center of the disk,

the apparatus comprising:

10 an optical head for outputting electrical signals based on reflected light obtained by irradiating the recording medium with the laser light, the optical head including a photodetector including two light-receiving portions divided in a direction corresponding to a tracking direction of the laser light;

an addition amplifier for generating a sum signal of electrical signals output from the two light-receiving portions;

15 a differential amplifier for generating a difference signal of electrical signals output from the two light-receiving portions;

a waveform correcting circuit for generating a corrected sum signal obtained by correcting an amplitude variation of the sum signal with the difference signal; and

20 a data demodulating circuit for reproducing the information by generating data information from the corrected sum signal.

27. The recording/reproducing apparatus of claim 26, wherein the optical information recording medium is the optical information recording medium of
25 claim 19.

28. The recording/reproducing apparatus of claim 26, wherein a control band of the data demodulating circuit includes a frequency of wobbling of the information tracks of the optical information recording medium containing
30 information to be recoded/reproduced by the recording/reproducing apparatus.

29. An optical information recording medium comprising a disk-shaped transparent substrate and n recording layers (where n is an integer of at least 2) for recording, reproducing or erasing information by irradiation of laser
35 light, the recording layers being formed over the substrate, wherein

the recording layers comprise information tracks including groove tracks and land tracks that are formed alternately in a radial direction of the

disk,

the information tracks comprise information recording regions and address regions interposed between the information recording regions, the information recording regions and the address regions being arranged along the tracking direction of the laser light,

prepit addresses for providing information on a position on the recording medium are formed on the address regions,

a pair of adjacent information tracks in the radial direction of the disk have a common address region on which a common prepit address is formed, and

in at least the first recording layer to the (n-1)th recording layer from the transparent substrate side, no pair of adjacent common address regions in the radial direction are arranged so as to be aligned on a straight line passing through the center of the disk.

30. The optical information recording medium of claim 29, wherein

the prepit addresses are formed so as to straddle a boundary of a pair of information tracks in the common address regions, and

steps for dividing the groove tracks from the land tracks are formed at both boundaries between the common address region and two information recording regions adjacent to the common address region in the radial direction of the disk.

31. The optical information recording medium of claim 29, wherein in the first recording layer to the (n-1)th recording layer from the transparent substrate side, a transmittance of the laser light is changed by recording information.

32. The optical information recording medium of claim 29, comprising a first recording layer and a second recording layer,

the first recording layer including a first information track for guiding the laser light from an inner disk circumference side to an outer disk circumference side by rotation of the disk in a predetermined direction, and

the second recording layer including a second information track for guiding the laser light from an outer disk circumference side to an inner disk circumference side by rotation of the disk in the predetermined direction.

33. A recording/reproducing method for an optical information recording medium for recording, reproducing or erasing information by irradiating an optical information recording medium with laser light,

5 the optical information recording medium comprising a disk-shaped transparent substrate and a recording layer for recording, reproducing or erasing information by irradiation of laser light, the recording layer being formed over the substrate, wherein

10 the recording layer comprises information tracks including groove tracks and land tracks that are formed alternately in a radial direction of the disk,

the information tracks comprise information recording regions and address regions interposed between the information recording regions, the information recording regions and the address regions being arranged along the tracking direction of the laser light,

15 prepit addresses for providing information on a position on the recording medium are formed on the address regions,

a pair of adjacent information tracks in the radial direction of the disk have a common address region on which a common prepit address is formed, and

20 no pair of adjacent common address regions in the radial direction are arranged so as to be aligned on a straight line passing through the center of the disk,

the method comprising:

25 detecting reflected light obtained by irradiating the recording medium with the laser light by a photodetector including two light-receiving portions divided in a direction corresponding to a tracking direction of the laser light;

generating a sum signal and a difference signal of electrical signals output from the two light-receiving portions;

30 generating a corrected sum signal obtained by correcting an amplitude variation of the sum signal with the difference signal; and

generating data information from the corrected sum signal, thereby reproducing the information.

34. The recording/reproducing method of claim 33, wherein the optical
35 information recording medium is the optical information recording medium of claim 29.

35. A recording/reproducing apparatus for an optical information recording medium for recording, reproducing or erasing information by irradiating an optical information recording medium with laser light,

the optical information recording medium comprising a disk-shaped transparent substrate and a recording layer for recording, reproducing or erasing information by irradiation of laser light, the recording layer being formed over the substrate, wherein

the recording layer comprises information tracks including groove tracks and land tracks that are formed alternately in a radial direction of the disk,

the information tracks comprise information recording regions and address regions interposed between the information recording regions, the information recording regions and the address regions being arranged along the tracking direction of the laser light,

prepit addresses for providing information on a position on the recording medium are formed on the address regions,

a pair of adjacent information tracks in the radial direction of the disk have a common address region on which a common prepit address is formed, and

no pair of adjacent common address regions in the radial direction are arranged so as to be aligned on a straight line passing through the center of the disk,

the apparatus comprising:

an optical head for outputting electrical signals based on reflected light obtained by irradiating the recording medium with the laser light, the optical head including a photodetector including two light-receiving portions divided in a direction corresponding to a tracking direction of the laser light;

an addition amplifier for generating a sum signal of electrical signals output from the two light-receiving portions;

a differential amplifier for generating a difference signal of electrical signals output from the two light-receiving portions;

a waveform correcting circuit for generating a corrected sum signal obtained by correcting an amplitude variation of the sum signal with the difference signal; and

a data demodulating circuit for reproducing the information by generating data information from the corrected sum signal.

36. The recording/reproducing apparatus of claim 35, wherein a control band of the data demodulating circuit includes a frequency of wobbling of the information tracks of the optical information recording medium containing information to be recorded, reproduced or erased by the recording/reproducing apparatus.

37. The recording/reproducing method of claim 35, wherein the optical information recording medium is the optical information recording medium of claim 29.

38. An optical information recording medium comprising a disk-shaped transparent substrate and n recording layers (where n is an integer of at least 2) for recording, reproducing or erasing information by irradiation of laser light, the recording layers being formed over the substrate, comprising a first recording layer and a second recording layer,

the first recording layer including a first information track for guiding the laser light from an inner disk circumference side to an outer disk circumference side by rotation of the disk in a predetermined direction, and

the second recording layer including a second information track for guiding the laser light from an outer disk circumference side to an inner disk circumference side by rotation of the disk in the predetermined direction.

39. The optical information recording medium of claim 38, wherein a difference in the number between the first recording layers and the second recording layers is 0 or 1.

40. A recording/reproducing method for an optical information recording medium for recording, reproducing or erasing information by irradiating the optical information recording medium of claim 38 with laser light, wherein

when, in either one recording layer selected from the first recording layer and the second recording layer, recording, reproducing or erasing information on either one information track selected from the first information track and the second information track ends at either one end selected from an inner circumferential end and an outer circumferential end of the one information track, subsequently in the other recording layer, recording, reproducing or erasing information is performed in succession from the corresponding end in the other track.